Quiz: Force, Mass, and Acceleration

Read each question. Circle the letter of the correct answer.

1. A person is lifting a box in the garage. Which of these would be shown in a free-body diagram of the person?

A. the force of gravity acting on the box

B. the force that the person is applying to the box

C. the normal force of the garage floor acting on the person

D. the force of the person's weight acting on the garage floor

2. Which of these statements is true when the same force is applied to two objects of different masses?

A. Both objects will accelerate at the same rate and in the same direction.

B. Both objects will accelerate at the same rate but in different directions.

C. The object with greater mass will experience a greater acceleration than the object with less mass.

D. The object with greater mass will experience a smaller acceleration than the object with less mass.

3. Which of these statements best describes the kinetic friction acting on an object that is touching a surface?

A. Kinetic friction is independent of the normal force.

B. Kinetic friction is usually more than static friction.

C. Kinetic friction acts perpendicularly to the surface.

D. Kinetic friction depends on the qualities of the surfaces in contact.

4. Which of these is always true about the normal force?

A. It is a scalar quantity.

B. It equals $\mathbf{F}_g$ in magnitude.

C. It points vertically upward.

D. It acts perpendicularly to a surface.

5. A hammer drives a nail into a piece of wood. Which of these statements describes an action-reaction pair in this situation?

A. The hammer exerts a force on the nail; the wood exerts a force on the nail.

B. The nail exerts a force on the hammer; the hammer exerts a force on the wood.

C. The hammer exerts a force on the nail; the hammer exerts a force on the wood.

D. The hammer exerts a force on the nail; the nail exerts a force on the hammer.

6. Which of these is the correct unit for a newton?

A. kg

B. kg•m/s

C. kg•m/s^2

D. kg•(m/s)^2

7. Which statement describes a free-body diagram?

A. It shows the total sum of all the forces.

B. It shows all the forces acting on an object.

C. It shows all the forces exerted by an object.

D. It shows all the forces acting in one dimension.

8. Which of these describes a free-body diagram of a ball falling through Earth's atmosphere?

A. only a downward arrow to represent the force of air resistance

B. only a downward arrow to represent the force due to gravity

C. a downward arrow to represent the force due to gravity and an upward arrow to represent the force of air resistance

D. an upward arrow to represent the force due to gravity and a downward arrow to represent the force of air resistance

9. A free-body diagram of a car is shown.

What is the magnitude of the gravitational force acting on the car?

A. 775 N

B. 5,800 N

C. 13,690 N

D. 14,700 N

10. Two objects of different masses are dropped from the same height at the same time in a vacuum chamber. Which statement describes the movement of the two objects?

A. They fall with equal accelerations and with equal displacements.

B. They fall with different accelerations and with equal displacements.

C. They fall with equal accelerations and with different displacements.

D. They fall with different accelerations and with different displacements.

Read each statement. Write your answer on the lines.

11. Describe the natural tendency of an object that is in motion.

12. Describe the movement of an object in motion when it experiences a nonzero net external force.

13. In a game of tug of war, a rope is pulled by a force of 182 N to the right and by a force of 108 N to the left. Calculate the magnitude and direction of the net horizontal force on the rope.

14. Describe the forces acting on a car as it moves along a level highway in still air at a constant speed.

15. A wagon having a mass of 91 kg is accelerated across a level road at 0.97 m/s^2. Identify the net force that acts on the wagon horizontally.